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This is the author's manuscript

Original Citation:

Availability:

This version is available <http://hdl.handle.net/2318/1605379> since 2017-03-27T14:18:37Z

Published version:

DOI:10.1080/13548506.2016.1220600

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This is the author's final version of the contribution published as:

Ghiggia, Ada; Castelli, Lorys; Riva, Giuseppe; Tesio, Valentina; Provenzano, Erica; Ravera, Mattia; Garzaro, Massimiliano; Pecorari, Giancarlo; Franco, Pierfrancesco; Potenza, Ilenia; Rampino, Monica; Torta, Riccardo.

Psychological distress and coping in nasopharyngeal cancer: an explorative study in Western Europe. *PSYCHOLOGY, HEALTH & MEDICINE*. Epub ahead of print (-) pp: 1-13.

DOI: 10.1080/13548506.2016.1220600

The publisher's version is available at:

<https://www.tandfonline.com/doi/full/10.1080/13548506.2016.1220600>

When citing, please refer to the published version.

Link to this full text:

<http://hdl.handle.net/2318/1605379>

**Psychological distress and coping in Nasopharyngeal Cancer:
an explorative study in Western Europe**

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Conflicts of interest

The authors declare no conflicts of interest.

Financial support

This study was performed without any financial or other contractual agreements that may cause conflicts of interest.

Abstract

Nasopharyngeal carcinoma (NPC) is the head and neck cancer with the greatest impact on patients' quality of life. The aim of this explorative study is to investigate the psychological distress, coping strategies and quality of life of NPC patients in the post-treatment observation period.

Twenty-one patients disease-free for at least two years were assessed with a medical and a psycho-oncological evaluation. Clinically relevant depressive symptoms (CRD) were present in 23.8% of patients and 33.3% reported clinically relevant anxiety symptoms (CRA).

Patients with CRD and CRA showed a significantly higher score in the use of hopelessness/helplessness and anxious preoccupation coping strategies and a worse quality of life. Even in the post-treatment period, about a quarter of patients showed CRD and CRA.

Results showed that patients with high anxiety or depressive symptoms seem to use dysfunctional coping strategies, such as hopelessness and anxious preoccupation, more than patients with lower levels of anxiety and depression. The use of these styles of coping thus seems to be associated to a higher presence of CRA or CRD symptomatology and to a worse quality of life.

Keywords: psychological distress, nasopharyngeal cancer, coping, quality of life, psychoncology.

Introduction

The impact of cancer diagnosis, and eventual treatments, may cause psychological issues and impairment of patients' quality of life that may continue in time in long-term cancer survivors (Sherman, Simonton, Adams, Vural & Hanna, 2000).

Of head and neck tumors, nasopharyngeal cancer (NPC) has the greatest impact on patients' quality of life (He & Liu, 2005; Fang et al., 2002).

NPC is relatively uncommon in Western Europe compared to countries in the Far East.

Official surveys of the International Agency for Research on Cancer (IARC) have estimated that the incidence of NPC in China in 2002 was 22.2 new cases in men and 9.8 in women per 100,000 inhabitants annually; in Europe the incidence was 0.3-0.4 new cases in men and 0.1-0.2 in women per 100000 inhabitants annually (Parkin, Bray, Ferlay & Pisani, 2002).

At present, most studies on NPC have been conducted in countries in the Far East, whereas only few data may be found in Western Europe with regard to psychosocial distress and coping style, i.e. the adaptation processes undertaken by individuals in stressful life events (Lee et al., 2007; Lai et al., 2003; Folkman, Lazarus, Gruen & DeLongis, 1986).

The prognosis for patients with NPC depends strongly on the stage of the disease at the time of diagnosis (Skinner & Van Hasselt, 1990; Epstein & Jones, 1993). Patients with advanced stages of head and neck cancer have physical limitations, associated with high psychological distress and a negative impact on daily life functioning (Fang et al., 2002).

The most frequent treatment for NPC is a combination of radiotherapy (RT) and chemotherapy. This has a non-negligible burden of side effects that may cause a series of adverse reactions in patients and thus impact negatively on the patient's global health (Oates et al., 2007; Marucci et al., 2012).

These symptoms may occur not only during treatment or the following few months but even later, and vary according to an individual's characteristics (Lue, Huang & Chen, 2008).

Although coping strategies can have an important impact on health status, to date only a few studies have investigated this issue in head and neck cancer patients, particularly in the context of NPC (Sherman et al., 2000; He & Liu, 2005; Elani & Allison, 2011; Airoidi et al., 2011). These studies focused on coping strategies and anxious/depressive symptomatology in different phases of treatment, but only a few explored how psychological distress may impact on quality of life and coping strategies (Lue et al., 2008; Elani & Allison, 2011).

Our preliminary exploratory study focused on a group of NPC patients during their post-treatment observation period, in order to address two goals:

1. To investigate the quality of life, psychological distress and coping strategies of patients with NPC.
1. To compare any differences in the quality of life and coping strategies between patients with high and patients with low levels of psychological distress.

Materials and methods

Patients and procedure

In this explorative study, all patients with a previous diagnosis of NPC and no evidence of the disease for at least two years were enrolled at the First Ear Nose and Throat (1st ENT) Division, Department of Surgical Sciences, at the University of Turin, during their post-treatment observation period. All patients had undergone chemo-radiation therapy for NPC, according to institutional protocols.

Exclusion criteria were: (1) second primary or disease relapses during follow-up, (2) neurological diseases, (3) severe psychiatric pathologies.

Of the 52 consecutively patients in the post-treatment period who attended the clinic and satisfied the inclusion criteria, 4 did not present themselves, 15 died, 9 were excluded due to complications, relapse or neurological disorder, and 3 did not provide consent. The remaining 21 gave their written informed consent to participate in the study. Institutional Review Board

approval was obtained. During a routine follow-up visit, all the patients were assessed for psychological status after the standard clinical evaluation. The main demographic, clinical features and chemo-radiotherapy characteristics are listed in **Table 1**. No statistically significant differences were detected in the socio-demographic and clinical characteristics between included and excluded patients.

Medical evaluation

The Karnofsky Performance Status (KPS) scale was administered to measure the level of the patients' functional impairments and medical care requirements (Buccheri, Ferrigno & Tamburini, 1996).

All subjects underwent evaluation of signs and symptoms (rhinorrhea, nasal obstruction, xerostomy, reduced or altered taste and smell function), objective oropharyngeal evaluation and endoscopic fiber optic nasal examination.

In order to evaluate late/long-term effects of radiation therapy on NPC patients, we used the Radiation Therapy Oncology Group (RTOG)–European Organization for Research and Treatment of Cancer (EORTC) late radiation morbidity scoring system, which is widely employed both for clinical and research purposes (Cooper, Fu, Marks & Silverman, 1995).

Psychological assessment

Psychological distress

The level of anxiety and depression was assessed by a self-report questionnaire specifically developed for subjects with a medical illness, the Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983; Kobayashi, Sugimoto, Matsuda, Matsushima & Kishimoto, 2008; Katz, Kopek, Waldron & Devins, 2004). It is divided into two subscales, each with 7 items coded in a Likert scale from 0 to 3. For both HADS subscales, we adopted a validated and commonly used cut-off point of 8 to dichotomize the levels of psychological symptoms (Wang et al., 2011; Castelli, Binaschi, Caldera, Mussa & Torta, 2011).

The Distress Thermometer (DT) is a visual analog scale for assessing the patient's level of distress from 0 ("no distress") to 10 ("extreme distress"), with a score of 4 or more indicating significant levels of distress (Grassi et al., 2013; Castelli et al., 2015).

Coping Strategies

The short version of the Mental Adjustment to Cancer Scale (Mini-MAC) was administered to measure the following coping strategies: helplessness/hopelessness, anxious preoccupation, fighting spirit, cognitive avoidance, and fatalism (Grassi et al., 2005; Wang, Tu, Liu, Yeh & Hsu, 2013). It is a self-report scale of 29 items, each question rated on a 4-point Likert scale, from 1 ("definitely does not apply to me"), to 4 ("definitely applies to me").

Quality of life

The Italian version of the European Organisation for Research and Treatment of Cancer Quality-of-Life-Questionnaire-C30 (EORTC QLQ-C30) and the European Organisation for Research and Treatment of Cancer Quality-of-Life Questionnaire-Head and Neck 35 (EORTC QLQ-H&N35) were administered. The EORTC QLQ-C30 assesses the quality of life (QoL) in patients with cancer; it includes a global score, five functional scales, three symptomatic scales and six single items for symptoms. Whereas higher scores for symptomatic areas indicate a lower QoL and severe symptoms, higher scores for the global QoL suggest a better level of functioning. The EORTC QLQ-H&N35 is a specific questionnaire for subjects with head and neck cancer. It assesses the gravity of the symptoms, and is divided into 6 multiple-item scales and 11 single-items; a high score for the symptom scales or items represents a high level of symptomatology (Al-Mamgani et al., 2013).

Statistical analysis

All statistical analyses were performed using the Statistical Package for Social Science – for Windows, Version 21.0 (SPSS Inc., Chicago, IL, USA).

Descriptive statistics were used to describe socio-demographic, clinical and psychological data. Given the small sample size, patients with and without clinically relevant depression and anxiety (CRD vs. no-CRD; CRA vs. no-CRA) were compared by means of non-parametric statistics (Mann-Whitney U tests for independent samples).

For all analyses, p values $< .05$ were considered statistically significant.

Results

Medical evaluation

Chemo-radiotherapy schemes are given in **Table 1**. Cisplatin-based concurrent chemotherapy (CT) was administrated weekly or every three weeks; neoadjuvant CT schemes included cisplatin/fluorouracil or docetaxel/cisplatin/fluorouracil; finally adjuvant CT was based on cisplatin and fluorouracil. Radiotherapy was performed using two-dimensional (4 patients), conformal three-dimensional (5 patients) or intensity-modulated techniques (12 patients). Only 2 patients underwent selective or type III modified radical neck dissection for persistent nodal disease.

In the medical evaluation, the main symptoms were nasal obstruction (48%), hypogeusia (48%) and xerostomia (81%). In addition, in the fiber optic endoscopic evaluation, nasopharyngeal hyperemia and/or secretions were observed in 4% of patients.

The RTOG/EORTC evaluation of the mucous membrane demonstrated slight-to-moderate toxicity (grade 1-2) in 66% of the sample (**Table 2**). Salivary gland functioning evaluation showed a moderate-to-severe impairment (grade 2–3) reported by 67% of the patients.

Psychological distress

The mean scores of the psychological distress variables (HADS and DT) are listed in **Table 1**. Overall, the results showed a moderate percentage of patients with clinically relevant depression (CRD) and anxiety (CRA) or distress symptoms. Five patients out of 21 (23.8%)

reported CRD while 7 out of 21 (33.3%) reported CRA. As far as the DT was concerned, 9 patients out of 21 (42.9%) showed a clinically relevant level of distress.

Coping strategies

MINI-MAC results evidenced that fighting spirit, cognitive avoidance and fatalism were used more than hopelessness/helplessness or anxious preoccupation (**Table 1**).

Quality of life

Table 3 summarizes the results of the EORTC QLQ-C30 and QLQ-H&N35 on the quality of life. The total sample reported a relatively good level of perceived global health status (73.7 ± 19.0) and high levels of overall QoL (physical, role, emotional, cognitive and social functioning).

CRD vs. no-CRD and CRA vs. no-CRA

Comparing patients with and without clinically relevant symptoms of depression (CRD vs. no-CRD) (**Table 4**), we found a statistically significant difference in the following coping strategies subscales: hopelessness/helplessness ($p = .010$) and anxious preoccupation ($p = .025$), while no differences were found in the other coping subscales.

Comparing patients with and without clinically relevant anxiety symptoms (CRA vs. no-CRA) (**Table 4**), we found a statistically significant difference in the following coping style strategies: hopelessness/helplessness ($p = .010$), anxious preoccupation ($p = .013$) and fatalism ($p = .030$).

As far as quality of life was concerned (EORTC QLQ C-30) (**Table 5**), patients with CRD reported statistically lower scores in physical functioning ($p = .011$), role functioning ($p = .008$) and emotional functioning ($p = .022$) and a statistically significant higher score in the symptom scale of appetite loss ($p = .008$).

Patients with CRA (**Table 5**) showed significantly poorer functioning in role ($p < .001$), emotional ($p = .004$), cognitive ($p = .016$) and social ($p = .041$) subscales than patients

without CRA. On the symptoms scales, fatigue was significantly more severe ($p < .047$) in patients with CRA compared to those without CRA.

On the EORTC QLQ-H&N35 (**Table 5**), patients with CRD reported significantly higher scores on the symptoms scale with regard to senses problems ($p = .005$), trouble with social eating ($p = .001$), less sexuality ($p = .003$) and opening the mouth ($p = .007$). Patients with CRA reported higher scores on the symptoms scales, i.e., trouble with social eating ($p = .003$) and social contact ($p = .003$), less sexuality ($p = .004$), teeth ($p = .009$) and a tendency to feel pain ($p = .052$) than patients without CRA.

Discussion

This explorative study aimed to investigate the psychological profile of patients with NPC treated with combined radiotherapy and chemotherapy during their post-treatment observation period. While many studies on this pathology have been conducted in countries in the Far East, to our knowledge, studies on coping strategies and psychological distress in NPC patients have not yet been performed in Western nations. Therefore, this is the first study to simultaneously investigate psychological distress, coping strategies and quality of life in a sample of NPC western patients.

Depression and anxiety are both frequent co-morbid psychiatric conditions found among cancer patients and may happen at any moment of the disease's history, from diagnosis to subsequent phases of treatment (Hong & Tian, 2013; Deng, Zhong & Jiang, 2014).

Psychological distress is also linked to decreased social functioning, cognitive and physical impairment and reduced adherence to treatments, all factors that can result in an increased likelihood of cancer recurrence (Zabora, BrintzenhofeSzoc, Curbow, Hooker & Piantadosi, 2001).

Although only a few studies have been carried out on the emotional status of NPC patients, depression and anxiety symptoms have been frequently detected in NPC patients. In a study

on 43 NPC patients, Lue et al (2008) found a prevalence of anxiety and depressive symptoms of 51.2% and 44.2%, respectively, detected by the Beck Anxiety Inventory and the Beck Depression Inventory–II. Ma (1995) found high levels of psychological distress at the time of diagnosis, with a decrease of these symptoms during post-treatment stages. Deng et al. (2014) also found that distress, measured by the DT, varied significantly between the time of diagnosis and chemoradiotherapy phases in NPC patients. The DT was found to be the lowest at the time of diagnosis, whilst when the treatment started, the number of patients with distress gradually increased (Deng et al., 2014).

In our study, almost half of the patients (42.9%) showed a score above the cut-off for DT, despite the fact that the assessment was made in the post-treatment period. In addition, using the HADS, one of the most widely used tools to evaluate the level of psychological distress in cancer populations (Zigmond & Snaith, 1983; Castelli et al., 2011), our study showed that about one quarter of patients (23.8%) reported clinically relevant depressive symptoms, while about one third (33.3%) experienced clinically relevant anxiety.

Our data also highlighted that the presence of psychological distress was associated to a worse quality of life and with a higher use of dysfunctional coping strategies to cancer, such as hopelessness and anxious preoccupation. Sherman et al. (2000) suggested that patients with head and neck cancer use different coping strategies at different stages of the disease and treatments. They noted that the post-treatment period was a stressful phase, both for the patient and his/her family (Sherman & Simonton, 1999; Sherman et al., 2000). Between the few NPC studies conducted in countries in the Far East, He & Liu (2005) reported that the optimistic style was the most detected; Lai et al. (2003) investigated distress symptoms, hope and catastrophizing in 115 NPC patients during the radiation therapy and found a low overall score for catastrophizing that varied with a large standard deviation among patients, due to individual differences.

Previous studies conducted on different types of cancer found that adaptive strategies of coping seem to contribute to a person's best response to the disease (Petticrew, Bell & Hunter, 2002; Hassanein, Musgrove & Bradbury, 2005). In a study on head and neck cancer, Kugaya, Akechi, Okamura, Mikami & Uchitomi (1999) used the Mental Adjustment to Cancer (MAC) scale to evaluate the coping strategies adopted by patients, and showed that a depressed mood was associated with the helplessness/hopelessness strategy (Grassi, Rosti, Lasalvia & Marangolo, 1993). Elani & Allison (2011), in a longitudinal study on head and neck cancer, compared patients according to their combined levels of anxiety and depression, to evaluate whether patients with low levels of psychological distress adopted different styles of coping. They found that higher levels of anxiety and depression were associated with "blamed self", "wishful thinking" and "avoidance" coping strategies.

In line with the literature, we found that patients with high anxiety or depressive symptoms seem to use dysfunctional coping strategies, such as hopelessness and anxious preoccupation, more than patients with lower levels of anxiety and depression. The use of these styles of coping thus seems to be associated to a higher presence of CRA or CRD symptomatology and to a worse quality of life.

NPC patients usually undergo a multimodal treatment that impacts heavily on their quality of life and physical functionality. The standard care for advanced NPC disease is concomitant chemoradiotherapy, which usually results in a series of side effects: swallowing dysfunction, dry mouth, sense and speech problems, issues with social eating and social contact (Airoldi et al., 2011; Chaturved, Shenoy, Prasad, Senthilnathan & Premlatha, 1996). All these complications may compromise social functioning. In the late toxicity evaluation, our sample reported slight-to-moderate impairment of the mucous membrane and salivary gland function. These data were observed in previous studies on patients treated for head and neck cancer (Oates et al., 2007; Cooper et al., 1995).

In the present study, we assess quality of life using the EORTC QLQ-H&N35, a site-specific module for head and neck cancer patients, as a supplement to the EORTC QLQ-C30, a questionnaire developed to measure the QoL of mixed cancer patients. Several studies have evaluated the different effects of radiation therapy on the quality of life of patients with NPC in the different stages of treatment, from pre- to post- radiotherapy or chemotherapy (Lee et al., 2007; Oates et al., 2007).

Our results highlighted a relatively good level of perceived global health status and high levels of overall functional scales. Similarly, a study of Lue et al. (2008), in a cohort of 43 NPC patients complicated by post-radiotherapy endocrinopathy, found that emotional and cognitive functional scales were significantly affected.

Regarding the site-specific module of the EORTC QLQ-H&N35, we found that patients with depressive and anxiety symptoms reported more serious symptoms. The overall scores showed higher scores in problems regarding teeth, dry mouth and sticky saliva, as already found by previous studies (Lue et al., 2008; Cengiz, Ozyar & Esassolak, 2005).

The main limitation of this explorative study is the small size of the sample. Although this limitation reflects the low prevalence of NPC in the Western population, the limited number of patients affects the statistical power of the study, which results underpowered. Therefore our preliminary results have to be interpreted with caution and should not be generalized to the larger population. Further longitudinal studies with a higher number of patients are necessary to better evaluate the relationship between psychological distress, coping and quality of life at different stages of the disease/treatments.

In conclusion, our exploratory study is the first in a Western country to simultaneously evaluate the psychological distress, coping strategies and quality of life in NPC patients. We found that even during the post-treatment observation period a moderate percentage of patients showed clinically relevant anxiety and depressive symptoms. Furthermore, the

psychological distress seems to be associated with a higher use of dysfunctional coping strategies, such as hopelessness/helplessness and anxious preoccupation and with a lower quality of life, especially in the functional scales. In addition, specific symptoms of NPC patients - such as trouble with social eating and opening the mouth - appeared to be associated with the presence of psychological distress. These findings suggest the need for further longitudinal studies exploring the association between psychological distress and coping strategies over time, in order to organize the psychological interventions and to facilitate the use of more adaptive coping strategies for dealing with the disease, thus reducing further negative impacts on the quality of life of the patients.

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Table 1. Demographic, clinical and psychological variables

	N = 21
Sex (N (%))	
Female	3 (14.3)
Male	18 (85.7)
Age (years)	
Mean \pm SD	54.1 \pm 12.0
Time after last radiotherapy (months)	
Mean \pm SD	67 \pm 29.6
Range	26-124
Educational Level (N (%))	
Basic education (ISCED 0-2)	12 (57)
Secondary education (ISCED 3/4)	9 (43)
Tertiary education (ISCED 5/6)	0 (0)
Stage of Cancer (N (%))	
I	1 (4.8)
II	4 (19)
III	9 (42.9)
IV	7 (33.3)
Karnofsky Performance Status Index	
Mean \pm SD	95.7 \pm 5.1
Treatment schemes (N (%))	
Concurrent chemoradiotherapy	3 (14)
Concurrent chemoradiotherapy + adjuvant chemotherapy	4 (19)
Neoadjuvant chemotherapy+concurrent chemoradiotherapy	14 (67)
Radiation doses (Gy)	
Total Fractionated Dose to T	69.4 \pm 1.1
Dose to low-risk nodes	51.0 \pm 11.1
Dose to high-risk nodes	59.0 \pm 1.9
Dose to left parotid gland	39.9 \pm 14.8
Dose to right parotid gland	39.3 \pm 16.8
Psychological distress (Mean \pm SD)	
HADS-Depression	5.4 (4.0)
HADS-Anxiety	5.9 (3.8)
Distress Thermometer (DT)	3.1 (2.9)
Mini-MAC (Mean \pm SD)	
Hopelessness/Helplessness	1.7 (0.6)
Anxious Preoccupation	2.4 (0.7)
Fighting Spirit	3.1 (0.4)
Cognitive Avoidance	2.7 (0.7)
Fatalism	3.0 (0.5)

Abbreviations: HADS: Hospital Anxiety and Depression Scale, cut-off score = 8.

DT: Distress Thermometer, cut-off score = 4.

Mini-MAC: Mini Mental Adjustment to Cancer Scale, score range 1-4, from 1 (definitely does not apply to me) to 4 (definitely applies to me).

Table 2. RTOG/EORTC Late radiation morbidity scoring system, frequencies and percentages in the 21 patients.

Grade and mean		No. of patients (%)
<i>Skin</i>		
0	None	2 (10)
1	Slight atrophy, pigmentation change, some hair loss	15 (71)
2	Patchy atrophy, moderate teleangiectasia, total hair loss	4 (19)
3	Marked atrophy, gross teleangiectasia	0 (0)
4	Ulceration	0 (0)
5	Death directly related to late effects of radiation	0 (0)
<i>Subcutaneous tissue</i>		
0	None	4 (19)
1	Slight fibrosis and loss of subcutaneous fat	13 (62)
2	Moderate fibrosis but asymptomatic,	3 (14)
3	Severe fibrosis and loss of subcutaneous,	1 (5)
4	Necrosis	0 (0)
5	Death directly related to radiation late effects	0 (0)
<i>Mucous membrane</i>		
0	None	5 (24)
1	Slight atrophy and dryness	10 (47)
2	Moderate atrophy and teleangiectasia, little mucous	4 (19)
3	Marked atrophy with complete dryness, severe teleangiectasia	2 (10)
4	Ulcerations	0 (0)
5	Death directly related to radiation late effects	0 (0)
<i>Salivary gland</i>		
0	None	3 (14)
1	Slight dryness of mouth, good response to stimulation	5 (24)
2	Moderate dryness of mouth, poor response on stimulation	9 (43)
3	Complete dryness of mouth, no response on stimulation	4 (19)
4	Fibrosis	0 (0)
5	Death directly related to radiation late effects	0 (0)

Abbreviations: RTOG, Radiation Therapy Oncology Group;

EORTC, European Organization for Research and Treatment of Cancer.

Table 3. Quality of life: EORTC QLQ-C30 and EORTC QLQ-H&N35 mean scores

EORTC QLQ-C30 mean scores		EORTC QLQ-H&N35 mean scores	
Scales	Mean (±SD)	Symptom Scales^b	Mean (±SD)
Global Health Status – QoL^a		Pain	19.4 (18.7)
Quality of life	73.7 (19.0)	Swallowing	15.5 (15.6)
Functional Scales[†]		Senses problems	21.4 (23.6)
Physical Functioning	82.5 (15.7)	Speech problems	11.6 (12.9)
Role Functioning	82.5 (25.5)	Trouble with social	17.9 (21.9)
Emotional Functioning	81.3 (20.9)	Trouble with social	5.4 (11.1)
Cognitive Functioning	82.5 (25.5)	Less sexuality	12.7 (24.1)
Social Functioning	85.7 (18.5)	Teeth	47.6 (40.2)
Symptom Scales^b		Opening mouth	31.7 (26.8)
Fatigue	28.6 (24.0)	Dry mouth	54.0 (34.1)
Nausea and Vomiting	4.8 (10.7)	Sticky saliva	42.9 (33.6)
Pain	7.1 (11.3)	Coughing	21.4 (27.5)
Dyspnea	14.3 (24.9)	Felt ill	12.7 (24.7)
Insomnia	34.9 (32.4)	Pain killers	28.6 (46.3)
Appetite Loss	15.9 (27.1)	Nutritional	9.5 (30.1)
Constipation	17.5 (22.6)	Feeding tube	9.5 (30.1)
Diarrhea	1.6 (7.3)	Weight loss	14.3 (35.9)
Financial Difficulties	19.0 (24.9)	Weight gain	14.3 (35.9)

Abbreviations: EORTC QLQ-C30: European Organization for Research and Treatment of Cancer Quality of Life, Questionnaire-Core 30- questions;

EORTC QLQ-H&N35: European Organization for Research and Treatment of Cancer

Quality of Life Questionnaire-Core 30-Head and Neck 35-questions; QoL, quality of life.

^aHigher score indicates better functioning.

^bHigher score indicates severe symptoms

Table 4. Comparison of Mini-MAC scores between patients with and without psychological distress.

Depression (Mean (\pmSD))			
	With (5 patients)	Without (16 patients)	p Value
Hopelessness	2.3 (0.7)	1.4 (0.4)	.010*
Anxious Preoccupation	3.2 (0.8)	2.1 (0.5)	.025*
Fighting Spirit	2.9 (0.5)	3.2 (0.4)	.732
Cognitive Avoidance	2.9 (0.7)	2.7 (0.7)	.984
Fatalism	3.4 (0.5)	2.9 (0.4)	.522
Anxiety (Mean (\pmSD))			
	With (7 patients)	Without (14 patients)	p Value
Hopelessness	2.2 (0.7)	1.4 (0.3)	.010*
Anxious Preoccupation	2.9 (0.8)	2.1 (0.5)	.013*
Fighting Spirit	3.0 (0.4)	3.2 (0.5)	.248
Cognitive Avoidance	2.7 (0.7)	2.7 (0.7)	.647
Fatalism	3.1 (0.6)	2.93 (0.4)	.030*

Patients with and without psychological distress were compared by means of Mann Whitney U tests for independent samples.

** p values < .05.*

Table 5. Comparison of EORTC QLQ C-30 and EORTC QLQ-H&N35 scores between patients with and without psychological distress.

	Depression		Anxiety	
	With (7 patients)	Without (14 patients)	With (6 patients)	Without (15 patients)
EORTC QLQ C-30				
Global Health Status – QoL ^a	63.3 (22.5)	77.2 (17.1)	63.9 (20.2)	78.0 (17.5)
Functional Scales^a				
Physical Functioning (PF2)	65.3 (16.6) *	87.9 (11.2) *	72.4 (19.0)	87.6 (11.3)
Role Functioning (RF2)	66.7 (16.7) *	87.5 (26.2) *	61.9 (18.5) *	92.9 (22.4) *
Emotional Functioning (EF)	60.0 (28.5) *	88.0 (12.9) *	63.1 (24.9) *	90.5 (10.8) *
Cognitive Functioning (CF)	63.3 (38.0)	88.5 (18.0)	61.9 (31.5) *	92.9 (14.2) *
Social Functioning (SF)	70.0 (27.4)	90.0 (12.1)	71.4 (23.0) *	92.9 (10.8) *
Symptom Scales^b				
Fatigue (FA)	48.9 (30.0)	22.2 (18.6)	44.4 (26.4) *	20.6 (18.9) *
Nausea and Vomiting (NV)	6.7 (14.9)	4.2 (9.6)	9.5 (16.3)	2.4 (6.0)
Pain (PA)	10.0 (14.9)	6.2 (10.3)	11.9 (12.6)	4.8 (10.2)
Dyspnea (DY)	26.7 (43.5)	10.4 (16.0)	23.8 (37.1)	9.5 (15.6)
Insomnia (SL)	46.7 (29.8)	31.2 (33.3)	52.4 (26.2)	26.2 (32.5)
Appetite Loss (AP)	46.7 (38.0) *	6.2 (13.4) *	33.3 (38.5)	7.1 (14.2)
Constipation (CO)	33.3 (23.6)	12.5 (20.6)	19.0 (17.8)	16.7 (25.3)
Diarrhea (DI)	0.0 (0.0)	2.1 (8.3)	0.0 (0.0)	2.4 (8.9)
Financial Difficulties (FI)	33.3 (33.3)	15.0 (21.0)	28.6 (30.0)	14.3 (21.5)
EORTC QLQ-H&N35^b				
Pain	31.7 (21.6)	15.6 (16.6)	32.1 (21.7)	13.1 (13.8)
Swallowing	25.0 (16.7)	12.5 (14.6)	15.5 (14.0)	15.5 (14.0)
Senses problems	46.7 (21.7) *	13.5 (18.5) *	35.7 (27.9)	14.3 (18.3)
Speech problems	17.8 (16.8)	9.7 (11.4)	19.0 (13.9)	7.9 (11.0)
Trouble with social eating	40.0 (29.1) *	10.9 (14.2) *	36.9 (26.7) *	8.3 (10.8) *
Trouble with social contact	14.7 (19.7)	2.5 (4.8)	14.3 (16.1) *	0.9 (2.4) *
Less sexuality	43.3 (32.5) *	3.1 (9.1) *	33.3 (31.9) *	2.4 (8.9) *
Teeth	66.7 (40.8)	41.7 (39.4)	80.9 (26.2) *	30.9 (35.7) *
Opening mouth	60.0 (14.9) *	22.9 (34.4) *	47.6 (17.8)	23.8 (27.5)
Dry mouth	73.3 (27.9)	47.9 (34.4)	71.4 (30.0)	45.2 (33.6)
Sticky saliva	53.3 (38.0)	39.6 (32.7)	52.4 (37.8)	38.1 (31.6)
Coughing	36.7 (24.7)	16.7 (27.2)	21.4 (28.4)	21.4 (28.1)
Felt ill	26.7 (43.5)	8.3 (14.9)	23.8 (37.1)	7.1 (14.2)
Pain killers	20.0 (44.7)	31.2 (47.9)	28.6 (48.8)	28.6 (46.9)
Nutritional supplements	0.0 (0.0)	12.5 (34.2)	0.0 (0.0)	14.3 (36.3)
Feeding tube	20.0 (44.7)	6.2 (25.0)	28.6 (48.8)	0.0 (0.0)
Weight loss	20.0 (44.7)	12.5 (34.2)	14.3 (37.8)	14.3 (36.3)
Weight gain	0.0 (0.0)	18.7 (40.3)	28.6 (48.8)	7.1 (26.7)

Abbreviations: EORTC QLQ-C30, European Organization for Research and Treatment of Cancer

Quality of Life Questionnaire-Core 30-questions; QoL, quality of life.

EORTC QLQ-H&N35, European Organization for Research and Treatment of Cancer

Quality of Life Questionnaire-Core 30-Head and Neck 35-questions.

^aHigher score indicates better functioning.

^bHigher score indicates severe symptoms.

Patients with and without psychological distress were compared by means of Mann-Whitney U tests for independent samples.

* *p* values < .05.